$$K_{\alpha\beta\gamma}(t) = \beta\Gamma(\alpha)^{-1}L_G(t)\int_a^{k(t)} \frac{L_f(y)L_m(y)}{y}\,\mathrm{d}y \quad \textit{if}\ \beta+\gamma=0.$$

The result for the case $\alpha+\beta+\gamma=0$ is also obtained.

On Asymptotic Behavior of Transition Density of Markovian Diffusion Processes with Small Diffusion: A Stochastic Control Approach

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Let $x(\cdot) \equiv x^\varepsilon(\cdot)$ be the diffusion given by

$$\mathrm{d}x(t) = b(x(t))\,\mathrm{d}t + \varepsilon\sigma(x(t))\,\mathrm{d}w(t),$$
$$x(0) = x \in R^n.$$

We are interested in the asymptotic behavior of the transition density $P_t^\varepsilon(x, y)$ of $x^\varepsilon(\cdot)$. A stochastic control method is proposed to study $P_t^\varepsilon(x, y)$ as $\varepsilon \to 0$. As a consequence of this, we will obtain a Ventsel-Friedlin type result:

$$\lim_{\varepsilon\to 0} \varepsilon^2 \log P_T^\varepsilon(x, y) = -\inf_{\substack{\phi(0)=x\\ \phi(T)=y}} \tfrac{1}{2}\int_0^T \|\dot\phi(t) - b(\phi(t))\|^2\,\mathrm{d}t$$

where $\|\dot\phi - b(\phi)\|^2 = \sum a^{ij}(\phi)(\dot\phi_i - b_i(\phi))(\dot\phi_j - b_j(\phi))$ and $(a^{ij}) = (\sigma\sigma^*)^{-1}$.

The Double Points of a Diffusion

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Consider a Markov process in R^d, with continuous paths and specified transition density functions. Under a set of hypotheses on the latter, we prove that almost all sample paths have double points. Then, we show that the diffusion in R^2 or R^3 generated by a non-degenerate elliptic operator has double points a.s.; this extends the classical results of Dvoretzky et al. for Brownian motions.

Random n-Simplices and a Central Limit Theorem

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Let $B_1, \ldots, B_n$ be independent copies of the Brownian motion on the d-dimensional torus. By virtue of the flatness of the torus we can define the Brownian random n-simplex $\boldsymbol{B}(V)$ for each n-cube V by

$$\boldsymbol{B}(\boldsymbol{t}) = B_1(t_1) + \cdots + B_n(t_n), \quad \boldsymbol{t} = (t_1, \ldots, t_n) \in V.$$